# SmartSwitch 6000
Advanced Router Module
Installation/User's Guide

CABLETRON SYSTEMS

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Manufacturer's Address:	**35 Industrial Way** **PO Box 5005** **Rochester, NH 03867**
European Representative Name:	**Mr. J. Solari**
European Representative Address:	**Cabletron Systems Limited** **Nexus House, Newbury Business Park** **London Road, Newbury** **Berkshire RG14 2PZ, England**
Conformance to Directive(s)/Product Standards:	**EC Directive 89/336/EEC** **EC Directive 73/23/EEC** **EN 55022** **EN 50082-1** **EN 60950**
Equipment Type/Environment:	**Networking Equipment, for use in a Commercial** **or Light Industrial Environment.**

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Manufacturer	Legal Representative in Europe
Mr. Ronald Fotino	Mr. J. Solari
Full Name	Full Name
Compliance Engineering Manager	Managing Director - E.M.E.A.
Title	Title
Rochester, NH, USA	Newbury, Berkshire, England
Location	Location

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Introduction

The Cabletron Systems SmartSwitch 6000 Advanced Router Module, the 6SSRM-02, provides non-blocking, high-speed Layer-2 (switching), Layer-3 (routing), and Layer-4 (application) switching. This chapter provides a basic overview of the 6SSRM-02 software and hardware feature set.

- If you want to install the 6SSRM-02 now, see Chapter 2, "Installation".

- If you want to boot the 6SSRM-02 software and perform basic configuration tasks now, see Chapter 3, "Software Installation and Setup".

- If you want to set up a management station for using CoreWatch, see Chapter 4, "Installing and Starting Cabletron CoreWatch".

Specifications

The 6SSRM-02 provides high-speed switching and full non-blocking throughput. The hardware provides high-speed performance regardless of the performance monitoring, filtering, and Quality of Service (QoS) features enabled by the software. You do not need to accept performance compromises to run QoS or access control lists (ACLs).

The following table lists the basic hardware and software specifications for the 6SSRM-02.

Table 1-1   Basic hardware and software specifications

Feature	Specification
Throughput	• 8.0-Gbps non-blocking switching fabric • 6.0 million packets-per-second routing throughput
Capacity	• Up to 16,000 routes • Up to 128,000 Layer-4 application flows • Up to 180,000 Layer-2 MAC addresses • 4,096 Virtual LANs (VLANs) • 2,000 Layer-2 security and access-control filters • 3MB input/output buffering per Gigabit port • 1MB input/output buffering per 10/100 port
Routing protocols	• IP: RIP v1/v2, OSPF, BGP v2/v3/v4 • IPX: RIP, SAP • Multicast: IGMP, DVMRP
Bridging and VLAN protocols	• 802.1d Spanning Tree • 802.1Q (VLAN trunking)
Media Interface protocols	• 802.3 (10Base-T/100Base-TX)
Quality of Service (QoS)	• Layer-2 prioritization (802.1p) • Layer-3 source-destination flows • Layer-4 source-destination flows • Layer-4 application flows
RMON	• RMON v1/v2 for each port

Table 1-1   Basic hardware and software specifications (Continued)

Feature	Specification
Management	• SNMP • CoreWatch Element Manager (GUI) • Emacs-like Command Line Interface (CLI)
Port mirroring	• Traffic from specific ports • Traffic to specific expansion slots (line cards)

This guide and other 6SSRM-02 documentation refers to the 6SSRM-02's Layer-2, Layer-3, and Layer-4 switching and routing. These layers are based on the International Standards Organization (ISO) 7-layer reference model. Here is an example of that model. The 6SSRM-02 operates within the layers that are not shaded. Notice that Layer-2 is divided into an LLC layer and a MAC layer. The 6SSRM-02 operates at the MAC layer but not the LLC layer.

Layer 7	Application
Layer 6	Presentation
Layer 5	Session
Layer 4	TCP/UDP - application
Layer 3	IP/IPX - routing
Layer 2	LLC
Layer 2	MAC -bridging
Layer 1	Physical Interfaces

TCP/UDP Services

The following table lists some well known TCP/UDP services provided by the 6SSRM-02.

Table 1-2   TCP/UDP services

TCP Port	UDP Port	Description
23		Telnet
	161	SNMP
	67	BOOTP/DHCP Relay Agent
	520	Routed

Features

This section describes the following 6SSRM-02 features:

•   Address-based and flow-based bridging

•   Port-based VLANs and protocol-based VLANs

•   IP and IPX routing

•   Layer-4 (application) switching

•   Security

•   Quality of Service (QoS)

•   Statistics

•   Management

Bridging

The 6SSRM-02 provides the following types of high-speed bridging:

•   **Address-based bridging** – The 6SSRM-02 performs this type of bridging by looking up the destination address in an L2 lookup table on the line card that receives the bridge packet from the network. The L2 lookup table indicates the exit port(s) for the bridged packet. If the packet is addressed to the 6SSRM-02's own MAC address, the packet is routed rather than bridged.

- **Flow-based bridging** – The 6SSRM-02 performs this type of bridging by looking up an entry in the L2 lookup table containing both the source and destination addresses of the bridge packet.

Your choice of bridging method does not affect 6SSRM-02 performance. However, address-based bridging is more efficient because it requires fewer table entries while flow-based bridging provides tighter management and control over bridged traffic.

The 6SSRM-02 ports perform address-based bridging by default, but can be configured to perform flow-based bridging instead of address-based bridging on a per-port basis. A port cannot be configured to perform both types of bridging at the same time.

Port and Protocol VLANs

The 6SSRM-02 supports the following types of Virtual LANs (VLANs):

- **Port-based VLANs** – A port-based VLAN is a set of ports that comprises a Layer-2 broadcast domain. The 6SSRM-02 confines MAC-layer broadcasts to the ports in the VLAN on which the broadcast originates. 6SSRM-02 ports outside the VLAN do not receive the broadcast.

- **Protocol-based VLANs** – A protocol-based VLAN is a named set of ports that comprises an IP or IPX broadcast domain. The 6SSRM-02 confines IP or IPX broadcasts to the ports within the IP or IPX based VLAN. Protocol-based VLANs sometimes are called subnet VLANs or Layer-3 VLANs.

You can include the same port in more than one VLAN, even in both port-based and protocol-based VLANs. Moreover, you can define VLANs that span across multiple 6SSRM-02s. To simplify VLAN administration, the 6SSRM-02 supports 802.1q trunk ports, which allow you to use a single port to "trunk" traffic from multiple VLANs to another 6SSRM-02 or switch which supports 802.1q.

Routing

The 6SSRM-02 provides high-speed routing for the following protocols:

- **Internet Protocol (IP)** – the protocol switching and routing devices use for moving traffic within the Internet and within many corporate intranets.

- **Internet Packet Exchange (IPX)** – a protocol by Novell used in Netware products.

Note: All other protocols that require routing must be tunneled using IP.
By default, the 6SSRM-02 uses one MAC address for all interfaces. The 6SSRM-02 can be configured to have a separate MAC address for each IP interface and a separate MAC address for

each IPX interface. When the 6SSRM-02 receives a packet whose destination MAC address is one of the 6SSRM-02's IP or IPX interface MAC addresses, the port that received the packet from the network uses information in the module's L3 lookup tables (or information supplied by the motherboard) to route the packet to its IP destination(s).

You can create only one IP and IPX interface on a single port or VLAN. You can add secondary IP addresses to the same IP interface. When you add an interface to a set of ports, you are adding a VLAN to those ports. Ports that contain IP and IPX interfaces can still perform Layer-2 bridging.

IP Routing

The 6SSRM-02 supports the following IP unicast routing protocols:

- RIP v1 and RIP v2
- OSPF v2
- BGP v2/v3/v4

IP interfaces do not use a specific routing protocol by default. When you configure an interface for routing, you also specify the routing protocol the interface will use.

IP Multicast Routing

The 6SSRM-02 supports the following IP multicast routing protocols:

- IGMP v1 and IGMP v2
- DVMRP v3

The 6SSRM-02 does not use a specific IP Multicast routing protocol by default. Configuring an interface for IP Multicast simultaneously specifies its routing protocol.

IPX Routing

The 6SSRM-02 supports the following IPX routing protocols:

- IPX RIP – a version of the Routing Information Protocol (RIP) tailored for IPX
- IPX SAP – the Service Advertisement Protocol, which allows hosts attached to an IPX network to reach printers, file servers, and other services

By default, IPX routing is enabled on the 6SSRM-02 when an IPX interface is created.

Layer-4 Switching

In addition to Layer-2 bridging and Layer-3 routing, the 6SSRM-02 performs Layer-4 switching. Layer-4 switching is based on applications and flows.

- **Layer-4 applications** – The 6SSRM-02 understands the application for which an IP or IPX packet contains data and therefore enables you to manage and control traffic on an application basis. For IP traffic, the 6SSRM-02 looks at the packet's TCP or UDP port number to determine the application. For IPX packets, the 6SSRM-02 looks at the destination socket to determine the application.

- **Layer-4 flows** – The 6SSRM-02 can store Layer-4 flows in each line card. A Layer-4 flow consists of the source and destination addresses in the IP or IPX packet combined with the TCP or UDP source and destination port number (for IP) or the source and destination socket (for IPX). You can therefore manage and control individual flows between hosts on an individual application basis.

A single host can have many individual Layer-4 entries in the 6SSRM-02. For example, an IP host might have separate Layer-4 application entries for email, FTP, HTTP, and so on, or separate Layer-4 flow entries for specific email destinations and for specific FTP and Web connections.

Security

The bridging, routing, and application (Layer-2, Layer-3, and Layer-4) support described in previous sections enables you to implement security filters that meet the specific needs of your organization. You can implement the following types of filters to secure traffic on the 6SSRM-02:

- Layer-2 source filters (block bridge traffic based on source MAC address)

- Layer-2 destination filters (block bridge traffic based on destination MAC address)

- Layer-2 flow filters (block bridge traffic based on specific source-destination pairs)

- Layer-3 source filters (block IP or IPX traffic based on source IP or IPX address)

- Layer-3 destination filters (block IP or IPX traffic based on destination IP or IPX address)

- Layer-3 flow filters (block IP or IPX traffic based on specific source-destination pairs)

- Layer-4 application filters (block traffic based on UDP or TCP source and destination ports for IP or source and destination sockets for IPX)

Quality of Service

Although the 6SSRM-02 supplies non-blocking high-speed throughput, you can configure the 6SSRM-02 to apply Quality of Service (QoS) policies during peak periods to guarantee service to specific hosts, applications, and flows (source-destination pairs). This is especially useful in networks where the traffic level can exceed the network medium's capacity.

The 6SSRM-02 QoS is based on four queues: control, high, medium, and low. Control traffic has the highest priority, high the second highest, and so on. The default priority for all traffic is low.

You can configure QoS policies for the following types of traffic:

- Layer-2 prioritization (802.1p)
- Layer-3 and Layer-4 application flows

Statistics

The 6SSRM-02 can provide extensive statistical data on demand. You can access the following types of statistics:

- Layer-2 RMON and MIB II Statistics – Port statistics for normal packets and for errors (packets in, packets out, CRC errors, and so on)
- Layer-3 RMON v2 Statistics – Statistics for ICMP, IP, IP-interface, IP routing, IP multicast, VLAN
- Layer-4 RMON v2 Statistics – Statistics for TCP and UDP

Management Platforms

You can manage the 6SSRM-02 using the following management platforms:

- Command Line Interface (CLI) – An EMACs editor-like interface that accepts typed commands and responds when applicable with messages or tables. You will use the CLI to perform the basic setup procedures described in Chapter 3 of this guide.
- CoreWatch – Cabletron Systems' Java-based device management software. CoreWatch provides a graphical interface to the 6SSRM-02, providing most of the same monitoring and control features as the CLI.
- SNMP MIBs and traps – The 6SSRM-02 supports SNMP v1 and many standard networking MIBs. You can access the 6SSRM-02's SNMP agent using Cabletron Systems integration software for HP OpenView 5.x on Windows NT or Solaris 2.x, or Cabletron Systems Spectrum

on Solaris 2.x. Chapter 3, "Software Installation and Setup" in this guide explains how to set up SNMP on the 6SSRM-02. Chapter 4, "Installing and Starting Cabletron CoreWatch" explains how to access the 6SSRM-02's SNMP agents.

Hardware Overview

This section describes the 6SSRM-02's hardware specifications. Chapter 2, "Installation" in this guide describes how to install the hardware. This section describes the following hardware:

- Module and external controls
- Motherboard features
- Line Cards

Module

The 6SSRM-02 module contains two expansion slots (slots 1 and 2).

Figure 1-1 shows the front view of a loaded 6SSRM-02.
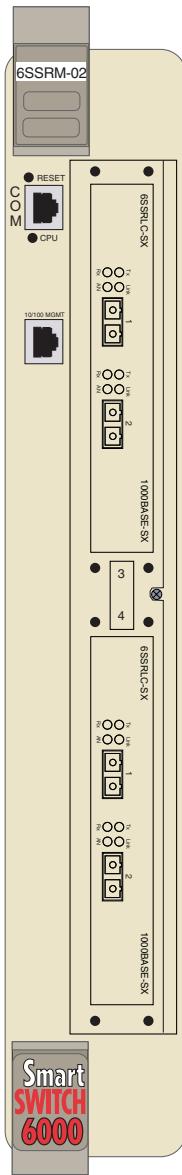
Figure 1-1   Front View of 6SSRM-02

External Controls

The 6SSRM-02 has the following external controls. Where appropriate, this guide describes how to use the controls.

- A COM port for serial connection from a management terminal. Use this port to establish a direct CLI connection to the 6SSRM-02. The default baud rate is 9600.

- A 10Base-T/100Base-TX Data Terminal Equipment (DTE) port for network connection from a management terminal. The port is configured as Media Data Interface (MDI). Use this port to establish a CoreWatch management connection to the 6SSRM-02 over a local or bridged Ethernet segment.

- A Reset switch. Use this switch to reboot the 6SSRM-02's motherboard from the internal boot flash in the event of a system failure. The Reset switch is recessed in the 6SSRM-02's chassis, so you will have to use a tool like a small allen wrench to activate the switch.

- CPU Status LED: Red   Fatal System Error
                                Yellow   Diagnostic Mode
                                Yellow/Flashing   Boot PROM is Active
                                Green   Functioning Normally

Motherboard Features

The internal "motherboard" performs all the 6SSRM-02's computing and routing functions. It contains system-wide bridging and routing tables. Traffic that does not yet have an entry in the L2 and L3/L4 lookup tables on individual line cards is handled by the motherboard. After processing traffic, the motherboard updates the L2 and L3/L4 tables on the ports that received the traffic. The ports thus "learn" about how to forward traffic.

Boot Flash

The motherboard has a boot flash containing the 6SSRM-02's boot software and configuration files. The system software image file resides on an internal flash chip and can be upgraded from a TFTP server.

RAM Memory

The 6SSRM-02's motherboard uses 128MB of RAM to hold routing and other tables. This RAM is "fixed" and is not removable or upgradable.

Line Cards

The following Line Cards can be installed in the 6SSRM-02:

• 6SSRLC-TX	8-port 10/100BASE-TX
• 6SSRLC-FX	8-port 100BASE-FX
• 6SSRLC-SX	2-port 1000BASE-SX
• 6SSRLC-LX	2-port 1000BASE-LX
• 6SSRLC-LX70	1-port 1000BASE-LLX (70 KM)
• 6SSRLC-SER	2-port serial
• 6SSRLC-SERC	4-port serial with compression
• 6SSRLC-SERCE	4-port serial with compression and encryption

Note: Due to a power restriction with the SmartSwitch 6000, the 6SSRM-02 can only support one linecard when either 6SSRLC-FX or 6SSRLC-TX is installed. Any other combination of two linecards is fully supported in the SmartSwitch 6000.

10/100BASE-TX Line Card

The 10/100BASE-TX line card contains eight independent Ethernet ports. Each port senses whether it is connected to a 10-Mbps segment or a 100-Mbps segment and automatically configures itself as a 10Base-T or 100Base-TX port. Figure 1-2 shows the front panel of the 10/100BASE-TX line card.
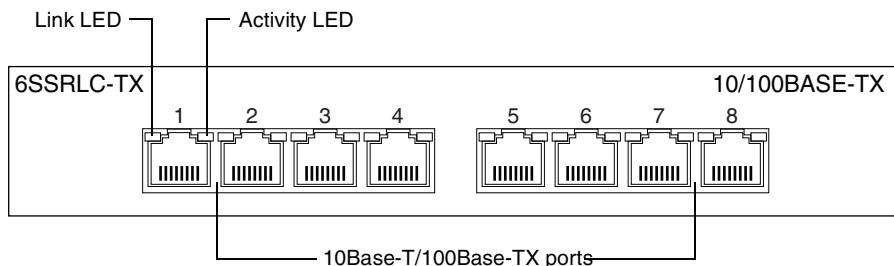
Figure 1-2   Front Panel of 10/100BASE-TX Line Card

Cabling and Connector Specifications

The following table lists the media specifications for the 10/100BASE-TX line card.

Table 1-3   10/100BASE-TX Line Card specifications

Port Type	Specification
10Base-T	• 802.3 standard • RJ-45 connector wired as Media Data Interface Crossed (MDIX); see "10/100BASE-TX Line Card" on page 12 for pin assignments • EIA Category 3, 4, or 5 unshielded twisted pair cabling • Maximum 328 feet (100 meters) segment length
100Base-TX	• 802.3u standard • RJ-45 connector wired as Media Data Interface Crossed (MDIX); see "10/100BASE-TX Line Card" on page 12 for pin assignments • EIA Category 5 unshielded twisted pair cabling • Maximum 328 feet (100 meters) segment length

LEDs

The 10/100BASE-TX line card uses the following LEDs.

Table 1-4   10/100BASE-TX Line Card LEDs

LED	Description
Link	Each port has two LEDs on its connector. The green LED on the left side of the connector indicates the link status. When this LED is lit, the port hardware is detecting that a cable is plugged into the port and the port has established communication with the device at the other end.
Activity	The amber LED on the right side of each port connector flashes each time the port's transceiver sends or receives packets.

100BASE-FX Line Card

The 100BASE-FX line card provides the same features as the 10/100BASE-TX line card but uses multimode fiber-optic cable (MMF) to connect to the network.
Figure 1-3 shows the front panel of the 100BASE-FX line card.
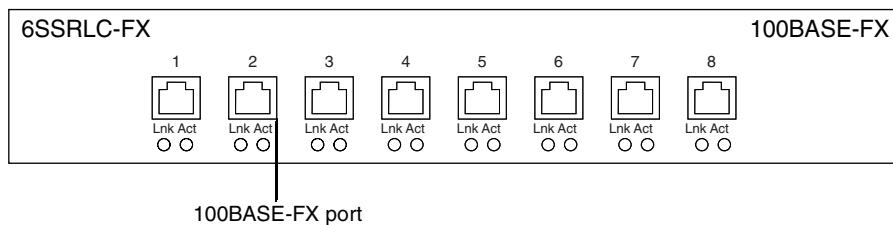
Figure 1-3   Front panel of 100BASE-FX Line Card

Cabling and Connector Specifications

The following table lists the media specifications for the 100BASE-FX line card.

Table 1-5   100BASE-FX Line Card specifications

Port type	Specification
100Base-FX	• 802.3u standard • SC-style Media Interface Connector (MIC); either connection pin in the MIC can be used for transmit or receive. • 62.5 micron multimode fiber-optic cable • Maximum 412 meters (1352 feet) segment length for half-duplex links • Maximum 2 kilometers (6562 feet) segment length for full-duplex links

LEDs

The 100BASE-FX line card uses the following LEDs.

Table 1-6   100BASE-FX Line Card LEDs

LED	Description
Lnk	Each port has two LEDs located to the left of the connector. The green Lnk LED indicates the link status. When this LED is lit, the port hardware is detecting that a cable is plugged into the port and the port has established communication with the device at the other end.
Act	The amber Act LED flashes each time the port's transceiver sends or receives packets.

1000BASE-SX Line Card

The 1000BASE-SX line card contains two independent Gigabit (1000-Mbps) Ethernet ports. The ports connect to multimode-mode fiber (MMF) cables. Figure 1-4 shows the front panel of the 1000BASE-SX line card.
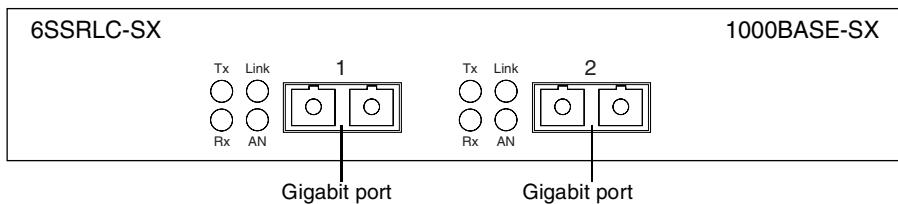

Figure 1-4   Front panel of 1000BASE-SX Line Card

Cabling and Connector Specifications

The following table lists the media specifications for the 1000BASE-SX line card.

Table 1-7   1000BASE-SX Line Card specifications

Port type	Specification
1000Base-SX	• 802.3z standard (also uses 802.3x for flow control)
	• SC-style Media Interface Connector (MIC)
	• 62.5 micron or 50 micron multimode fiber-optic cable
	• Maximum 275 meters (902 feet) segment length for 62.5 micron fiber-optic cable, based on installed fiber bandwidth
	• Maximum 550 meters (1804 feet) segment length for 50 micron fiber-optic cable, based on installed fiber bandwidth

LEDs

The 1000BASE-SX line card uses the following LEDs.

Table 1-8   1000BASE-SX Line Card LEDs

LED	Description
Per-port Link	• Green – indicates that the port hardware detects a cable plugged into the port and a good link is established. • Red (intermittent) – indicates that the port received an error during operation. • Red (solid) – indicates that the port hardware detects a cable plugged into the port, however, a bad link is established. • Off – indicates that no link from exists with the port.

Table 1-8   1000BASE-SX Line Card LEDs (Continued)

LED	Description
Per-port Rx	• Green – indicates when the port's transceiver receives packets. • Orange – indicates when the port's transceiver receives flow-control packets.
Per-port Tx	• Green – indicates when the port's transceiver transmits packets. • Orange – indicates when the port's transceiver transmits flow-control packets.
Per-port AN	• Green – indicates that the line card is autonegotiating the operating mode of the link between full-duplex and half-duplex. • Orange (intermittent) – indicates that autonegotiation is in process. • Orange (solid) – indicates a problem with autonegotiation configuration. • Red – indicates an autonegotiation failure. This fault may occur if the link partner does not support full duplex. • Off – indicates that autonegotiation has been disabled or the link is down.

1000BASE-LX Line Card

The 1000BASE-LX line card provides the same features as the 1000BASE-SX line card, and supports both single-mode fiber (SMF) and MMF. Figure 1-5 shows the front panel of the 1000BASE-LX line card.
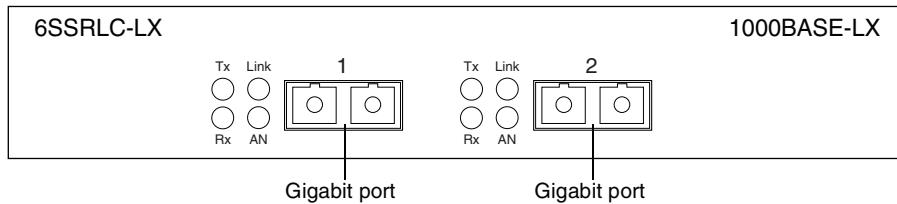
Figure 1-5   Front panel of 1000BASE-LX Line Card

Cabling and Connector Specifications

The following table lists the media specifications for the 1000BASE-LX line card.

Table 1-9   1000BASE-LX Line Card specifications

Port type	Specification
1000Base-LX	• 802.3z standard (also uses 802.3x for flow control)
	• SC-style Media Interface Connector (MIC)
	• 62.5 micron or 50 micron multimode fiber-optic cable
	• 9.5 micron single-mode fiber-optic cable
	• Maximum 550 meters (1804 feet)[1] segment length for 62.5 micron fiber-optic cable, based on installed fiber bandwidth
	• Maximum 550 meters (1804 feet) segment length for 50 micron fiber-optic cable, based on installed fiber bandwidth
	• Maximum 5 kilometers (16400 feet) segment length for 10 micron single-mode fiber-optic cable

1. Patch cord required.

LEDs

The 1000BASE-LX line card uses the following LEDs.

Table 1-10   1000BASE-LX Line Card LEDs

LED	Description
Per-port Link	• Green – indicates that the port hardware detects a cable plugged into the port and a good link is established. • Red (intermittent) – indicates that the port received an error during operation. • Red (solid) – indicates that the port hardware detects a cable plugged into the port, however, a bad link is established. • Off – indicates that no link exists with the port.

Table 1-10   1000BASE-LX Line Card LEDs (Continued)

LED	Description
Per-port Rx	• Green – indicates when the port's transceiver receives packets. • Orange – indicates when the port's transceiver receives flow-control packets.
Per-port Tx	• Green – indicates when the port's transceiver transmits packets. • Orange – indicates when the port's transceiver transmits flow-control packets.
Per-port AN	• Green – indicates that the line card is autonegotiating the operating mode of the link between full-duplex and half-duplex. • Orange (intermittent) – indicates that autonegotiation is in process. • Orange (solid) – indicates a problem with autonegotiation configuration. • Red – indicates an autonegotiation failure. This fault may occur if the link partner does not support full duplex. • Off – indicates that autonegotiation has been disabled or the link is down.

1000BASE-LLX (70KM)

The 1000BASE-LLX line card supports a single port and contains 16 MB of memory. Advanced optical drivers have been added to the existing SSR Gigabit line cards to increase distance support to between 15 and 70 Km over 10 um Single Mode Fiber. Use the 1000 BASE-LX module for distances less than 5 Km. Figure 1-6 shows the front panel of the 1000BASE-LLX line card.

```
6SSRLC-LX70                                                    1000BASE-LX

         Offline        Tx   Link        1
                        ○    ○                                      Hot
                        ○    ○        ┌──────┐                       ○
         Online         Rx   AN       │ ○  ○ │                      Swap
                                      └──────┘
```

Gigabit port
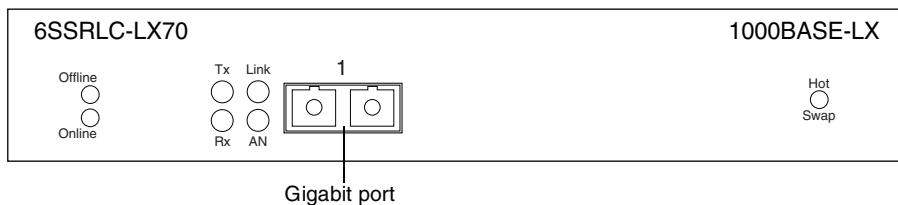
Figure 1-6   Front Panel of the 1000BASE-LLX Line Card

Dual Serial and Quad Serial – C/CE Expansion Modules

The Dual Serial line card contains a single dual serial WAN port (two serial ports located on one high density connector). The Quad Serial – C and Quad Serial – CE line cards each contain two dual serial WAN ports. In addition, the Quad Serial – C line card includes compression, and the Quad Serial – CE line card includes compression *and* encryption, for each WAN port. Figure 1-7 shows the front panel of the Dual Serial WAN line card.
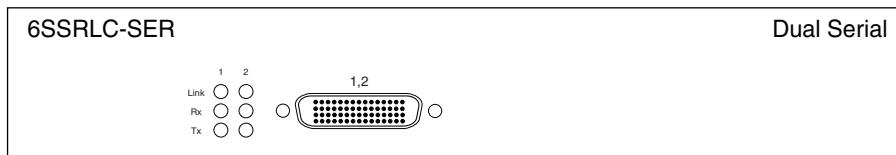
Figure 1-7   Front panel of Dual Serial WAN Line Card

Figure 1-8 shows the front panel of the Quad Serial WAN line card.
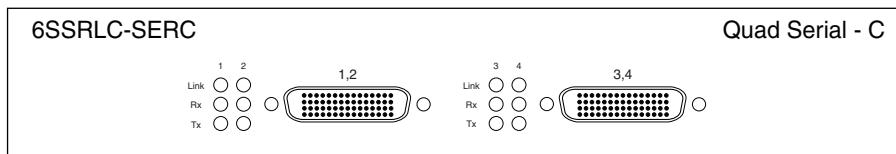
Figure 1-8   Front panel of Quad Serial – C/CE WAN Line Card

Cabling and Connector Specifications

The following table lists the media specifications for the Dual Serial and Quad
Serial – C/CE line cards.

Table 1-11   Dual Serial and Quad Serial – C/CE WAN Line Card specifications

| Port Type	Specification
Dual serial	• V.35, X.21, EIA530, EIA530A, or RS449
	• LFH-60 high density connector; see "Dual Serial and Quad Serial – C/CE Expansion Modules" on page 23 for pin assignments
	• Recommended 3 meters (10 feet) segment length for standard WAN Line Card-to-CSU/DSU data port.[1]

1. Connector cables for WAN line cards may be ordered from Cabletron Systems. For
detailed information, including part numbers, see "Dual Serial and Quad Serial – C/CE
Expansion Modules" on page 23.

LEDs

The Dual Serial and Quad Serial – C/CE line cards use the following LEDs.

Table 1-12   Dual Serial and Quad Serial – C/CE WAN Line Card LEDs

LED	Description
Per-port Link	Indicates that the line card detects a cable plugged into the port and a good link is established.
Per-port Rx	Indicates when the port's transceiver receives data.
Per-port Tx	Indicates when the port's transceiver transmits data.

Getting Help

For additional support related to this device or document, contact Cabletron Systems using one of the following methods:

World Wide Web	http://www.cabletron.com/
Phone	(603) 332-9400
Internet mail	support@cabletron.com
FTP	ftp://ftp.cabletron.com/
Login	*anonymous*
Password	*your email address*
To send comments or suggestions concerning this document, contact the Cabletron Systems Technical Writing Department via the following email address: **TechWriting@cabletron.com** *Make sure to include the document Part Number in the email message.*	

Before calling Cabletron Systems, have the following information ready:

- Your Cabletron Systems service contract number

- A description of the failure

- A description of any action(s) already taken to resolve the problem (e.g., changing mode switches, rebooting the unit, etc.)

- The serial and revision numbers of all involved Cabletron Systems products in the network

- A description of your network environment (layout, cable type, etc.)

- Network load and frame size at the time of trouble (if known)

- The device history (i.e., have you returned the device before, is this a recurring problem, etc.)

- Any previous Return Material Authorization (RMA) numbers

2

Installation

This chapter provides the instructions to install the 6SSRM-02. A Phillips screwdriver is required to install options into the module. Follow the order of the sections listed below to correctly install the module.

- Unpacking the Module

- Installing Options

- Installing the Module into the 6C105 Chassis

- Connecting to the Network

- Completing the Installation

Warning: Only qualified personnel should install the 6SSRM-02.

Note: Read the Release Notes shipped with the module to check for any exceptions to the supported features and operation documented in this guide.

Unpacking the Module

Unpack the module as follows:

1. Open the box and remove the packing material protecting the 6SSRM-02.

2. Verify the contents of the carton as listed in Table 2-1.

Table 2-1   Contents of 6SSRM-02 Carton

Item	Quantity
6SSRM-02	1
Antistatic Wrist Strap	1
Manual Accessory Kit	1

3. Remove the tape seal on the non-conductive bag to remove the 6SSRM-02.

4. Perform a visual inspection of the module for any signs of physical damage. Contact Cabletron Systems if there are any signs of damage.

Installing the Line Cards

Two Line Cards can be installed in the 6SSRM-02 module. They must be installed before the 6SSRM-02 module is installed into the 6C105 chassis. The Line Cards are shipped with installation instructions. Refer to these instructions before installing.

Note: Due to a power restriction with the SS6000, the 6SSRM-02 can only support one linecard when either 6SSRLC-FX or 6SSRLC-TX is installed. Any other combination of two linecards is fully supported in the SS6000.

Installing the Module into the 6C105 Chassis

Caution: Failure to observe static safety precautions could cause damage to the 6SSRM-02. Follow static safety handling rules and wear the antistatic wrist strap provided with the 6C105 chassis.

Do not cut the non-conductive bag to remove the module. Sharp objects contacting the board or components can cause damage.

The 6SSRM-02 can be installed in any of the slots that are available. To install a module, refer to Figure 2-1 and proceed as follows:

1. Remove the blank panel covering the slot in which the module will be installed. All other slots must remain covered to ensure proper airflow and cooling. (Save the blank plate in the event you need to remove the module.)

2. Carefully remove the module from the shipping box. (Save the box and packing materials in the event the module must be reshipped.)

3. Locate the antistatic wrist strap shipped with the 6SSRM-02. Attach the antistatic wrist strap to your wrist and plug the cable from the antistatic wrist strap into the ESD grounding receptacle at the upper right corner of the 6C105.

4. Remove the module from the plastic bag. (Save the bag in the event the module must be reshipped.) Observe all precautions to prevent damage from Electrostatic Discharge (ESD).
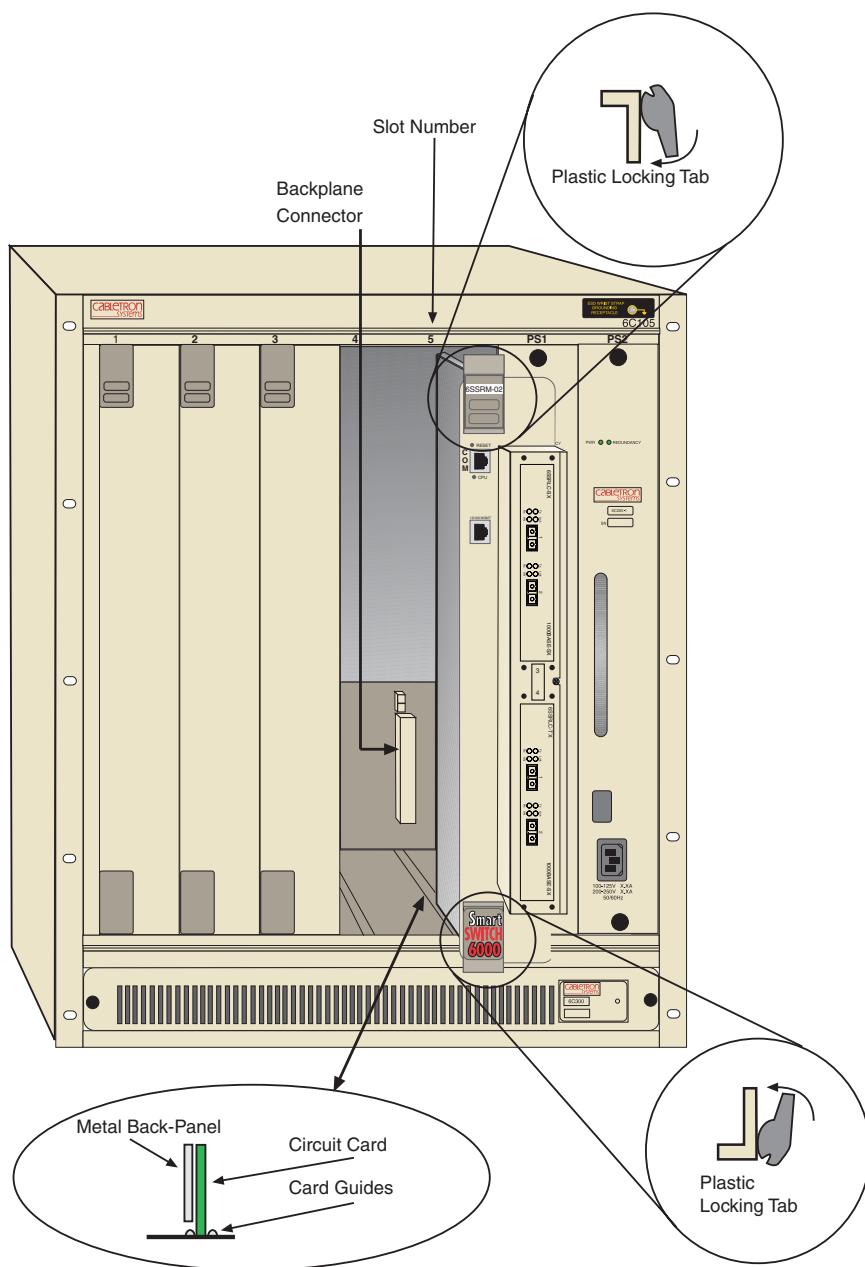
Figure 2-1   Installing an Interface Module

5. Examine the module for damage. If any damage exists, DO NOT install the module. Immediately contact Cabletron Systems.

Caution: To prevent damaging the backplane connectors in the following step, take care that the module slides in straight and properly engages the backplane connectors.

Ensure that the top plastic locking tab lines up with the desired slot number located on the front panel of the chassis. Refer to Figure 2-1.

6. Locate the slot guides that line up with the number of the slot in which the module will be installed. Install the module in the chassis by aligning the module circuit card between the upper and lower metal rail guides of the desired slot, sliding it into the chassis, and locking down the top and bottom plastic locking tabs, as shown in Figure 2-1. Take care that the module slides in straight and properly engages the backplane connectors.

7. If the chassis in which the module is installed was powered down for the installation, turn it back on. Check to see that the CPU LED settles at solid green after a few minutes. If the LED does not turn solid green, see Chapter 5 for details.

Completing the Installation

After installing the 6SSRM-02 proceed as follows:

1. If the chassis is installed in a rack that has strain-relief brackets, secure the cables by running the cables along the strain-relief bracket and tying them to the bracket using cable ties.

2. The 6SSRM-02 is now ready to be configured through the CLI interface. Refer to the *Command Line Interface Guide* and the *User Reference Guide* for configuration information.

3

Software Installation and Setup

This chapter provides the following software installation and basic setup procedures:

- Powering on and booting the software

- Starting the Command Line Interface (CLI)

- Setting basic system information

- Setting up SNMP community strings

- Setting up passwords

- Setting the DNS domain name and address

- Setting SYSLOG parameters

- Loading system image software

- Loading the boot PROM software

- Activating configuration changes and saving the configuration file

Powering On and Booting the Software

To power on the 6SSRM-02 and boot the software:

1. Make sure any exposed expansion slots are free of foreign objects, such as tools or your hands, and are covered with coverplates.

2. Insert the 6SSRM-02's into the 6C105 chassis. Assuming that your power source is currently active, the 6SSRM-02 will automatically power on and attempt to boot using the software image in the motherboard's boot flash. When the software finishes booting, the CPU LED lights up, indicating that the 6SSRM-02 software is online.

As the software boots, the management console attached to the 6SSRM-02's COM port displays messages related to the phases of the boot sequence. When the software is fully booted, the following message appears on the management console:

```
Press RETURN to activate console...
```

3. Press Return (or Enter) to activate the CLI on the console.

Starting the Command Line Interface

To start the Command Line Interface (CLI), power on the system. Startup messages appear on the console (the terminal attached to the COM port).

After the software is fully booted and you press Return (or Enter) to activate the CLI, the CLI prompts you for a password. You can define separate passwords for login access and Enable mode. The factory default password for both of these is set to blank. (Simply press Return.)

Access Modes

The CLI has the following access modes:

*   **User** – Allows you to display basic information and use basic utilities such as ping but does not allow you to display SNMP, filter and access control list information, or make other configuration changes. You can tell you are in User mode when the command prompt ends with a ">" character.

*   **Enable** – Allows you to display SNMP, filter, and access control information as well as all the information you can display in User mode. To enter Enable mode, enter the **enable** command, then supply the password when prompted. When you are in Enable mode, the command prompt ends with a "#" character.

*   **Configure** – Allows you to make configuration changes. To enter Configure mode, first enter Enable mode (**enable** command), then enter the **configure** command from the Enable command prompt. When you are in Configure mode, the command prompt ends with "(config)#."

*   **Boot** – This mode appears when the 6SSRM-02 or the system image is not found during bootup. You should enter the **reboot** command to reset the router. If the 6SSRM-02 still fails to bootup, please call Cabletron Systems. See **Getting Help**, on page 1-25.

Note: The command prompt will show the name of the 6SSRM-02 in front of the mode character(s). The default name is "ssr". The procedure in "Setting Basic System Information" on page 3-4 describes how to change the system name.

When you are in Configure or Enable mode, use the **exit** command or press Ctrl+Z to exit to the previous access mode.

Note: When you exit Configure mode, the CLI will ask you whether you want to activate the configuration commands you have issued. If you enter **yes** or **y**, the configuration commands you issued are placed into effect and the 6SSRM-02's configuration is changed accordingly. However, the changes are not written to the Startup configuration file in the 6SSRM-02's boot flash and therefore are not reinstated after a reboot. See "Activating Configuration Changes and Saving the Configuration File" on page 3-17 for information about saving configuration changes.

Basic Line Editing Commands

The CLI supports EMACs-like line editing commands. The following table lists some commonly used commands. For a complete set of commands, see the *SmartSwitch Router User Reference Manual*.

Table 3-1   Some commonly used CLI commands

Key sequence	Command
Ctrl+A	Move cursor to beginning of line
Ctrl+B	Move cursor back one character
Ctrl+D	Delete character
Ctrl+E	Move cursor to end of line
Ctrl+F	Move cursor forward one character
Ctrl+N	Scroll to next command in command history (use the **cli show history** command to display the history)
Ctrl+P	Scroll to previous command in command history
Ctrl+U	Erase entire line
Ctrl+X	Erase from cursor to end of line
Ctrl+Z	Exit current access mode to previous access mode

Setting Basic System Information

Use the procedure in this section to set the following system information:

- System time and date

- System name

- System location

- Contact name (the person to contact regarding this 6SSRM-02)

Note: Some of the commands in this procedure accept a string value. String values can be up a maximum of 255 characters in length, including blank spaces. Surround strings that contain blanks with quotation marks (example: **"string with internal blanks"**).

To set the system information:

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Use the following commands to set the system time and date and then verify the setting

   > **set date year** *<number>* **month** *<month-name>* **day** *<day>* **hour** *<hour>* **minute** *<minute>*
   >   **second** *<second>*
   >
   > **system show date**

   Here is an example:

   > ssr# **system set date year 1998 month january day 19 hour 11 minute 54 second 0**
   > Time changed to: Mon Jan 19 11:54:00 1998
   > ssr# **system show date**
   > Current time: Mon Jan 19 11:54:04 1998

3. Ensure that you are in Configure mode by entering the **configure** command in the CLI. The commands in Step 4 through Step 10 can be entered only from Configure mode.

4. Use the following commands to set the system name, location, and contact information:

   > **system set name "***<string>***"**
   > **system set location "***<string>***"**
   > **system set contact "***<string>***"**

Here is an example:

> ssr(config)# **system set name "ctron-ssr-1"**
> ssr(config)# **system set location "Sunnyvale, CA"**
> ssr(config)# **system set contact "John Smith"**

5. Use the **interface add ip** command to set the IP address and netmask for the en0 Ethernet interface, as shown in the following example::

> ssr(config)# **interface add ip en0 address-netmask 10.50.11.22/16**

Note: The en0 interface is automatically created by the system and is reserved for the 6SSRM-02's management port.

6. To show the changes accumulated in the scratchpad, enter the **show** command while in Configure mode, as shown in the following example:

> ssr(config)# **show**
> -EDIT-I-NOCONFIG, the running system has no configuration
>
> ******** Non-committed changes in Scratchpad ********
> 1*: system set name "ctron-ssr-1"
> 2*: system set location "Sunnyvale, CA"
> 3*: system set contact "John Smith"

When you enter commands in Configure mode, the 6SSRM-02 does not immediately execute the commands. Instead, the 6SSRM-02 checks the syntax of the commands and if they are syntactically correct, stores them in a temporary scratchpad in memory. The scratchpad is automatically cleared when you log out of the SmartSwitch, so you must activate the changes and then save them to the Startup configuration file to retain the changes, as explained below.

The scratchpad allows you to make configuration changes without worrying about the order in which you issue the commands. Also, if you change your mind about configuration changes you are making, you do not need to incrementally back out of the changes. You can simply choose not to activate them. As you become more familiar with the 6SSRM-02 and the CLI and begin to make detailed configuration changes, you may find the scratchpad quite useful. For simple changes such as the ones in this procedure, you might instead want to activate the changes as you go, then use CLI commands to view the results of the changes.

7. Enter the **save active** command to activate commands, such as the **"system set..."** commands you used in Step 4, in the scratchpad.

If you exit Configure mode (by entering the **exit** command or pressing Ctrl+Z) before activating any of your changes in the scratchpad, the CLI will ask you whether you want to make the changes in the scratchpad active by displaying the following message:

```
Do you want to make the changes Active [yes]?
```

8. Enter **yes** or **y** to activate the changes.

9. To display the active configuration, enter the **system show active-config** command, as shown in the following example:

```
ctron-ssr-1# system show active-config
Running system configuration:
    !
    ! Last modified from Console on Mon Jan 19 11:55:35 1998
    !
 1 : system set name "ctron-ssr-1"
 2 : system set location "Sunnyvale, CA"
 3 : system set contact "John Smith"
```

Changes in the active configuration take effect on the running system but will not be restored following a reboot.

10. To ensure that changes are restored following a reboot, you must save the active database to the Startup configuration file by taking the following steps:

    a. Enter the **exit** command to return to Enable mode.

    b. Enter the **copy active to startup** command.

    The CLI displays the following message:

```
Are you sure you want to overwrite the Startup configuration [no]?
```

11. Enter **yes** or **y** to add the active configuration to the Startup configuration file.

Note: You also can save active changes to the Startup configuration file from within Configure mode by entering the **save startup** command.

See "Activating Configuration Changes and Saving the Configuration File" on page 3-17 for more information about the scratchpad, active database, and Startup configuration.

Setting Up SNMP Community Strings

To use SNMP to manage the 6SSRM-02, you need to set up an SNMP community on the 6SSRM-02. Otherwise, the 6SSRM-02's SNMP agent runs in local trap process mode until you disable it using the **snmp stop** command. In addition, if you want to be able to access the SNMP traps issued by the 6SSRM-02's SNMP agent, you need to specify the IP address of the target for the SNMP traps.

To add the SNMP community string and specify the target for traps, take the following steps:

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Ensure that you are in Configure mode by entering the **configure** command in the CLI.

3. Use the following commands to add an SNMP community string and set a target for the traps.

> **snmp set community** *<community-name>* **privilege read**
> **snmp set target** *<IP-addr>* **community** *<community-name>*

Note: The target IP address must be locally attached to the 6SSRM-02. You cannot specify a target that is connected to the 6SSRM-02 by another router. If the IP address is more than one hop away from the 6SSRM-02, configure the 6SSRM-02 with a static route to the target so that a cold start trap is sent.

4. Enter the **show** command to examine the changes accumulated in the scratchpad.

5. Enter the **save active** command to activate the commands you entered in the previous steps.

6. To verify the changes, enter the **snmp show all** command.

Here is an example of the commands and output for configuring SNMP and saving the changes.

```
ctron-ssr-1# config
ctron-ssr-1(config)# snmp set community public privilege read-only
ctron-ssr-1(config)# snmp set target 10.50.11.12 community public
ctron-ssr-1(config)# save active
ctron-ssr-1(config)# exit
ctron-ssr-1# snmp show all
SNMP Agent status:
    enabled mode
SNMP Last 2 Clients:
10.50.100.53   Mon Mar 30 10:31:27 1998
10.50.100.43   Mon Mar 30 10:31:22 1998

SNMP Chassis Identity:
not configured.

Trap Table:
Index Trap Target Addr   Community String    Status
----- none configured -----

Traps by Type:
Authentication trap: enabled
Link Up/Down   trap: enabled

Community Table:
Index Community String       Privilege
1.   public             READ-WRITE


SNMP statistics:
    247019 packets received
        246346 get requests
        745 get-next requests
        184 get-bulk requests
        50 set requests
        0 bad SNMP versions
        1 bad community names
        0 ASN.1 parse errors
        0 PDUs too big
    247018 packets sent
        246346 get responses
        745 get-next responses
        184 get-bulk responses
        50 set responses
```

7. After verifying the SNMP configuration, save the changes to the Startup configuration file by entering the **copy active to startup** command.

Remember to enter **yes** or **y** when the CLI asks you whether you want to overwrite the Startup configuration.

Setting Up Passwords

You can password protect CLI access to the 6SSRM-02 by setting up passwords for login access and Enable access. Users who have a login password but not an Enable password can use only the commands available in User mode. Users with an Enable password can use the commands available in Enable and Configure modes as well as the commands in User mode.

In addition, you can set up the 6SSRM-02 for TACACS and/or RADIUS authentication on login and password by a TACACS or RADIUS server. You can find a section describing configuration of the 6SSRM-02 for TACACS and RADIUS in the *SmartSwitch Router User Reference Manual*.

Note: If a password is configured for Enable mode, the 6SSRM-02 prompts you for the password when you enter the **enable** command. Otherwise, the 6SSRM-02 displays a message advising you to configure an Enable password before entering Enable mode. From Enable mode, you can access Configure mode to make configuration changes.

The default password for each access level is blank. (Simply press Enter or Return without entering a password.) If you want to add password protection to the CLI, use the following procedure.

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Ensure that you are in Configure mode by entering the **configure** command in the CLI.

3. Use the following command for each password you want to set:

> **system set password login|enable** *<string>*|**none**

4. Enter the **show** command to examine the changes accumulated in the scratchpad.

5. Enter the **save active** command to activate the commands.

6. Enter the **system show active-config** command to verify the active changes.

Here is an example of the commands in the previous steps:

```
ctron-ssr-1(config)# system set password login demo
ctron-ssr-1(config)# system set password enable demo
ctron-ssr-1(config)# save active
ctron-ssr-1# exit
ctron-ssr-1# system show active-config

Running system configuration:
!
! Last modified from Console on Mon Jan 19 12:12:19 1998
!
 1 : system set name "ctron-ssr-1"
 2 : system set location "Sunnyvale, CA"
 3 : system set contact "John Smith"
 4 : system set hashed-password login jNIssH c976b667e681d03ccd5fc527f219351a
 5 : system set hashed-password enable zcGzbO 5d1f73d2d478ceaa062a0b5e0168f46a
 6 : snmp set community public privilege read
 7 : snmp set target 10.50.11.12 community public
```

Caution: Test all the new passwords before saving the active configuration to the Startup configuration file. As shown in the example above, the passwords are shown in the active configuration in an encrypted format and will also appear this way in the Startup configuration.

To keep your passwords secure, the 6SSRM-02 does not have a command for displaying passwords. If you forget a password, you can remove the password by entering the following command while in Configure mode. (See the *SmartSwitch Router Command Line Interface Reference Manual* for more information.)

```
system set password login|enable none
```

Setting the DNS Domain Name and Address

If you want the 6SSRM-02 to be able to access a DNS server, use the following procedure to specify the domain name and IP address for the DNS server.

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Use the following command to verify that the 6SSRM-02 can reach the DNS server by pinging the server, as shown in the following example:

```
ctron-ssr-1# ping 10.50.11.12
PING 10.50.11.12 (10.50.11.12): 56 data bytes
64 bytes from 10.50.11.12: icmp_seq=0 ttl=255 time=0 ms

--- 10.50.11.12 ping statistics ---


1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 0/0/0 ms
```

3. Ensure that you are in Configure mode by entering the **configure** command in the CLI.

4. If you have not done so already, use the **interface add ip** command to set the IP address and netmask for the en0 Ethernet interface, as shown in the following example:

```
ssr(config)# interface add ip en0 address-netmask 10.50.11.22/16
```

Note: The en0 interface is automatically created by the system and is reserved for the 6SSRM-02's management port.

5. Use the following command to specify the domain name for which the DNS server(s) have authority:

```
system set dns domain <domain-name>
```

where *<domain-name>* is your specified domain name (example: **cabletron.com**).

6. Use the following command to "add" one or more DNS servers to the 6SSRM-02:

```
system set dns server ["]<IP-address> [<IP-address>] [<IP-address>]["]
```

where *<IP-address>* is the IP address of the DNS server. You can specify up to three DNS servers.

Note: If you specify more than one IP address, you must separate the addresses with a space and surround them with a single pair of quotes. You do not need to surround a single IP address with quotes.

7. Enter the **save active** command to activate the commands and enter **yes** or **y** to activate the changes.

Here is an example of the commands above featuring the addition of two DNS server IP addresses:

```
ctron-ssr-1# config
ctron-ssr-1(config)# system set dns domain "mktg.cabletron.com"
ctron-ssr-1(config)# system set dns server "10.50.11.12 10.50.12.11"
ctron-ssr-1(config)# save active
```

8. Enter the **system show dns** command to verify the new DNS settings, as shown in the following example:

```
ctron-ssr-1# system show dns
DNS domain: cabletron.com, DNS server(s): 10.50.11.12 10.50.12.11
```

9. Use the **ping** command to verify that the 6SSRM-02 can resolve the DNS server name into its IP address, as shown in the following example:

```
ctron-ssr-1# ping ssr1
PING ssr1.mktg.cabletron.com (10.50.11.12): 56 data bytes
64 bytes from 10.50.11.12: icmp_seq=0 ttl=255 time=0 ms

--- ssr1.mktg.cabletron.com ping statistics ---
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 0/0/0 ms
```

Setting SYSLOG Parameters

The CLI can use SYSLOG messages to communicate the following types of messages to a SYSLOG server:

- **Fatal** – Provide information about events that caused the 6SSRM-02 to crash and reset.

- **Error** – Provide information about errors.

- **Warning** – Provide warnings against invalid configuration information and other conditions that are not necessarily errors. This is the default.

- **Informational** – Provide informational messages such as status messages. The SYSLOG messages that the 6SSRM-02 displays while booting the software and reading the startup configuration file are examples of Informational messages.

The 6SSRM-02 writes the SYSLOG messages to a SYSLOG daemon on UDP port 514. You can set the CLI to send all or only some of the message types. By default, the CLI sends warning, error, and fatal messages but not informational messages to the specified SYSLOG server.

Use the following procedure to specify the SYSLOG server and the types of messages you want the CLI to log on the server.

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Use the following command to verify that the 6SSRM-02 can reach the SYSLOG server by pinging the server:

   > **ping** *<IP-addr>*

3. Ensure that you are in Configure mode by entering the **configure** command in the CLI.

4. If you have not already done so, use the **interface add ip** command to set the IP address and netmask for the en0 Ethernet interface, as shown in the following example:

   > ssr(config)# **interface add ip en0 address-netmask 10.50.11.22/16**

   Note: The en0 interface is automatically created by the system and is reserved for the 6SSRM-02's management port.

5. Use the following commands to "add" the SYSLOG server to the 6SSRM-02, set the message level, and set the SYSLOG facility:

   > **system set syslog server** *<hostname-or-IP-addr>*
   > **system set syslog level fatal|error|warning|info**
   > **system set syslog facility** *<facility-type>*

   Here is an example:

   > ctron-ssr-1# **config**
   > ctron-ssr-1(config)# **system set syslog server 10.50.11.12**
   > ctron-ssr-1(config)# **system set syslog level info**
   > ctron-ssr-1(config)# **system set syslog facility local0**

6. Enter the **show** command to show the commands you just entered. Because you have not activated these configuration changes yet, they are listed in the scratchpad section of the output. Here is an example:

SSr-1(config)# **show**

Running system configuration:
!
! Last modified from Console on Mon Jan 19 12:37:21 1998
!
 1 : interface add ip en0 address-netmask 10.50.11.22/16
!
 2 : system set dns server 10.50.11.12
 3 : system set dns domain mktg.cabletron.com
 4 : system set name "ctron-ssr-1"
 5 : system set location "Sunnyvale, CA
 6 : system set contact "John Smith"
 7 : system set hashed-password login jNIssH c976b667e681d03ccd5fc527f219351a
 8 : system set hashed-password enable zcGzbO 5d1f73d2d478ceaa062a0b5e0168f46a
!
 9 : snmp set community public privilege read
10 : snmp set target 10.50.11.12 community public

******** Non-committed changes in Scratchpad ********
 1*: system set syslog server 10.50.11.12
 2*: system set syslog level info
 3*: system set syslog facility local0

Note: The other configuration changes made during this CLI session are also listed. Active changes are listed in the "Running system configuration section" and unactivated changes are listed in the "Non-committed changes in Scratchpad" section.

7. To activate the SYSLOG commands, enter the **save active** command.

Loading System Image Software

The 6SSRM-02 operates using the system image software installed in its internal flash chip. To upgrade the system software and operate using the upgraded image, go through the following procedure:

1. Display the current boot settings by entering the **system show version** command, as shown in the following example:

```
ssr8-2# system show version
Software Information
 Software Version  : 1.2.0.0
 Copyright         : Copyright (c) 1998 Cabletron Systems, Inc.
 Image Information : Version 1.2.0.0, built on Thu Jul 30 01:16:15 1998
 Image Boot Location: tftp://10.50.89.88/ssr1200
 Boot Prom Version : prom-1.1.0.0
```

Note: In this example, the location "pc-flash" indicates that the 6SSRM-02 is set to use the factory-installed system software in the motherboard's internal flash chip.

2. Copy the software upgrade you want to install onto a TFTP server that the 6SSRM-02 can access. (Use the **ping** command to verify that the SmartSwitch can reach the TFTP server.)

3. Use the following command to copy the software upgrade onto the internal flash chip in the 6SSRM-02:

system image add *<IPaddr-of-TFTP-host> <image-file-name>*

Here is an example:

```
ctron-ssr-1# system image add 10.50.11.12 ssr2000
Downloading image 'ssr1200' from host '10.50.11.12'
 to local image ssr1200 (takes about 3 minutes)
kernel: 100%
Image checksum validated.
Image added.
```

4. Enter the **system image list** command to verify that the new image exists on the internal flash chip, as shown in the following example:

```
ctron-ssr-1# system image list
Images currently available:
ssr1200
```

5. Use the following command to select the image file the 6SSRM-02 will use the next time you reboot the switch.

system image choose *<file-name>*

Here is an example:

```
ctron-ssr-1# system image choose ssr1200
Making image ssr1200 the active image for next reboot
```

6. Enter the **system image list** command to verify the change.

   Note: You do not need to activate this change.

Loading Boot PROM Software

The SmartSwitch boots using the boot PROM software installed in the 6SSRM-02's internal memory. To upgrade the boot PROM software and boot using the upgraded image, use the following procedure.

1. Display the current boot settings by entering the **system show version** command, as shown in the following example:

```
ctron-ssr-1# system show version
Software Information
 Software Version  : 1.2.0.0
 Copyright        : Copyright (c) 1998 Cabletron Systems, Inc.
 Image Information : Version 1.2.0.0, built on Thu Jul 30 01:16:15 1998
 Image Boot Location: tftp://10.50.89.88/ssr1200
 Boot Prom Version : prom-1.1.0.0
```

   Note: In this example, the location "pc-flash" indicates that the 6SSRM-02 is set to use the factory-installed software in the motherboard's internal flash chip.

2. Copy the software upgrade you want to install onto a TFTP server that the 6SSRM-02 can access. (Use the **ping** command to verify that the SmartSwitch can reach the TFTP server.)

3. Use the following command to copy the boot PROM upgrade into the 6SSRM-02's internal memory:

```
system promimage upgrade <IPaddr-of-TFTP-host> <image-file-name>
```

Here is an example:

```
ctron-ssr-1# system promimage upgrade 10.50.11.12 prom2
Downloading image 'prom-1.1.0.0' from host '10.50.11.12'
 to local image prom-1.1.0.0 (takes about 3 minutes)
kernel: 100%
Image checksum validated.
Image added.
```

4. Enter the **system show version** command to verify that the new boot PROM software is on the internal memory of the 6SSRM-02.

Activating Configuration Changes and Saving the Configuration File

The 6SSRM-02 uses three special configuration files:

•   **Active** – The commands from the Startup configuration file and any configuration commands that you have made active from the scratchpad (see below).

Caution: The active configuration remains in effect only during the current power cycle. If you power down or reboot the 6SSRM-02 without saving the active configuration changes to the Startup configuration file, the changes are lost.

•   **Startup** – The configuration file that the 6SSRM-02 uses to configure itself when the system is powered on.

•   **Scratchpad** – The configuration commands you have entered during a management session. These commands do not become active until you explicitly activate them. Because some commands depend on other commands for successful execution, the 6SSRM-02 scratchpad simplifies system configuration by allowing you to enter configuration commands in any order, even when dependencies exist. When you activate the commands in the scratchpad, the 6SSRM-02 sorts out the dependencies and executes the command in the proper sequence.

Activating the Configuration Commands in the Scratchpad

The configuration commands you have entered using procedures in this chapter are in the Scratchpad but have not yet been activated. Use the following procedure to activate the configuration commands in the scratchpad:

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Ensure that you are in Configure mode by entering the **configure** command in the CLI.

3. Enter the **save active** command.

    If you exit Configure mode (by entering the **exit** command or pressing Ctrl+Z) before activating any of your changes in the scratchpad, the CLI will ask you whether you want to make the changes in the scratchpad active by displaying the following message:

    > Do you want to make the changes Active [yes]?

4. Enter **yes** or **y** to activate the changes.

Saving the Active Configuration to the Startup Configuration File

After you save the configuration commands in the scratchpad, the 6SSRM-02 executes the commands and makes the corresponding configuration changes. However, if you power down or reboot the 6SSRM-02, the new changes are lost. Use the following procedure to save the changes into the Startup configuration file so that the 6SSRM-02 reinstates the changes when you reboot the software.

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Enter the **copy active to startup** command to copy the configuration changes in the Active configuration to the Startup configuration.

    The CLI displays the following message:

    > Are you sure you want to overwrite the Startup configuration [no]?

3. Enter **yes** or **y** to save the changes.

Note: You also can save active changes to the Startup configuration file from within Configure mode by entering the **save startup** command.

The new configuration changes are added to the Startup configuration file stored in the 6SSRM-02's boot flash.

Viewing the Current Configuration

If you want to view the current configuration:

1. Ensure that you are in Enable mode by entering the **enable** command in the CLI.

2. Enter the following command to display the status of each command line:

    > **system show active-config**

    The CLI displays the active configuration file with the following possible annotations:
    *   Commands without errors are displayed without any annotation.

    *   Commands with errors are annotated with an "E".

    *   If a particular command has been applied such that it can be expanded on additional interfaces/modules, then it is annotated with a "P". For example, if you enabled stp on all ports in the current system, however, the SmartSwitch contains only 1 module, then that particular command could be expanded at a later date when more modules have been added to the SmartSwitch.

        A command like **stp enable et.*.*** would be displayed as follows:

        > P: stp enable et.*.*

        indicating that it is only partially applied. If you add more modules to the SmartSwitch at a later date and then update the configuration file to encompass all of the available modules in the SmartSwitch, then the "P:" portion of the above command line would disappear when displaying this configuration file.

        If a potentially partial command, which was originally configured to encompass all of the available modules on the SmartSwitch, becomes only partially activated (after a hotswap or some such chassis reconfiguration), then the status of that command line will automatically change to indicate a partial completion status, complete with "P:".

    Note: Commands with no annotation or annotated with a "P:" are not in error.

4

Installing and Starting Cabletron CoreWatch

This chapter:

- Provides an overview of Cabletron CoreWatch, a Java-based graphical user interface (GUI) you can use to monitor and configure your SmartSwitch Router

- Discusses the browser and hardware requirements of CoreWatch

- Explains installing the CoreWatch software

- Describes starting CoreWatch

What Is Cabletron CoreWatch?

Cabletron CoreWatch is a comprehensive, easy-to-use, network management and device configuration application for SmartSwitches. Based on Java, CoreWatch provides configuration, monitoring, and reporting capabilities with the assistance of wizards and drag-and-drop operations. CoreWatch simplifies tasks such as configuring routers, VLANs, security filters, and setting up application-level QoS policies.

CoreWatch management features include:

- Java-based GUI

- Simplified routing configuration

- Intuitive QoS management

- Configuration of security filters and ACLs

- Drag-and-drop VLAN setup and administration

- Extensive performance monitoring

- Comprehensive configuration using wizards and drag-and-drop operation

- Detailed HTML-based reporting

System Requirements

CoreWatch can run in the Solaris, Windows NT, and Windows 95/98 environments. As shown in the following table, CoreWatch's system requirements depend on your operating system. The table identifies which browser to use with each operating system and gives the minimum hardware requirements for each environment.

Table 4-1   CoreWatch system requirements

	Solaris 2.5.1 or 2.6	**Windows NT 4.0x**	**Windows 95/98**
Browser	Netscape Navigator 3.0 or above	Netscape Navigator 3.0 or above, or Microsoft Internet Explorer 4.0 or above	Netscape Navigator 3.0 or above, or Microsoft Internet Explorer 4.0 or above
CPU	Sparc20 or above	Pentium 133 or above	Pentium 133 or above
RAM	128 MB	64 MB	64 MB
Disk	40 MB Free	20 MB Free	20 MB Free

Installing Cabletron CoreWatch

You can install CoreWatch on a Solaris 2.5.1, Solaris 2.6, Windows NT, or Windows 95/98 system. The method you use to install CoreWatch depends on your environment. Separate discussions on installing CoreWatch in the Solaris or Windows environments follow.

Installing on a Solaris System

To install CoreWatch from a CD onto a Solaris 2.5.1 or 2.6 system:

1. If you plan to integrate CoreWatch with HP OpenView, be sure the HP OpenView daemon is running. For details, see your HP OpenView documentation.

2. Insert the CoreWatch CD into your CD-ROM drive.

3. Log in as super user by entering the following command:

   ```
   % su - root
   ```

4. Ensure that you are in the appropriate subdirectory to access the CD-ROM by entering the following command:

```
# cd /cdrom/cdrom0
```

5. Run the CoreWatch installation script by entering the following command:

```
# install.sh
```

CoreWatch is installed on your system in the **/opt/CScw** directory.

6. Add **/opt/CScw/bin** to your environment path.

For details on adding items to a path, see your Solaris documentation.

Installing on a Windows NT or Windows 95/98 System

Note: You must have Admin privileges to install CoreWatch on a Windows NT system.
To install CoreWatch on a Windows NT or Windows 95/98 system:

1. If you plan to integrate CoreWatch with HP OpenView on a Windows NT system, be sure the HP OpenView daemon is running. For details, see your HP OpenView documentation.

2. Insert the CoreWatch CD into your CD-ROM drive and double-click on the **install.bat** icon. The CoreWatch installation wizard appears.

3. Click **Next**.

4. After reviewing the license agreement, click **Yes** to accept it.

5. Enter your name and your company's name in the appropriate text boxes. Then click **Next**.

6. Specify the folder in which you want to install the software and click **Next**.

   You can keep the default folder or click **Browse** and then browse to another folder.

7. Set up the type of installation by doing one of the following:
   • Choose **Typical** to install the most common options.

   • Choose **Compact** to install the minimum files needed to run CoreWatch.

   • Choose **Custom** and click **Next** if you are an advanced user and want to specify which files to install. Options with a check mark will be installed. Click to the left of an item to select or clear its check box.

8. Click **Next**.

9. Specify a name for the CoreWatch program group, which is Cabletron Systems CoreWatch by default. Then click **Next**.

10. When the browser window reappears, close it.

11. Specify whether you want to view the CoreWatch readme file, then click **Finish**.

    Options with a check mark will be performed. Click to the left of an item to select or clear its check box.

Starting CoreWatch

The method you use to start CoreWatch depends on whether you installed it in the Solaris or Windows environment. If you choose to integrate CoreWatch with SPECTRUM or HP OpenView during installation, you can start CoreWatch from within either environment in both Solaris and Windows NT/Windows 95/98.

Separate discussions on starting CoreWatch in the Solaris and Windows environments and from within SPECTRUM or HP OpenView follow.

Starting CoreWatch in Solaris

To start CoreWatch in the Solaris 2.5.1 or 2.6 environment:

1. Enter the following command at the Solaris prompt:

    ┌───┐
    │ % **CoreWatch**   │
    └───┘

    The **Login Dialog** dialog box appears.

    Note: If the CoreWatch command is not found, you can locate it in **/opt/CScw/bin**.

2. Type the name or IP address and community string for the SmartSwitch. If you do not know this information, see your network administrator.

3. Click **OK**.

Starting CoreWatch in Windows NT or Windows 95/98

To start CoreWatch in the Windows NT or Windows 95/98 environment:

1. Select the **Start** menu, choose **Programs**, choose **Cabletron Systems** CoreWatch, and then choose CoreWatch. The **Login Dialog** dialog box appears.

   Note: If you installed the program in a startup folder other than **Programs** > **Cabletron Systems** CoreWatch, select that folder from the Start menu and then select CoreWatch.

2. Type the name or IP address and community string for the SmartSwitch. If you do not know this information, see your network administrator.

3. Click **OK**.

Starting CoreWatch from within SPECTRUM Enterprise Manager

SPECTRUM Enterprise Manager is Cabletron Systems's flexible and scalable network management platform based on leading-edge, object-oriented, adaptive modeling technology. SPECTRUM, which is available on Solaris and Windows NT, provides a suite of bundled applications as well as additional optional applications. The SmartSwitch is modeled in SPECTRUM using the SmartSwRtrGIGASwRtr model type. The SmartSwitch can be Auto-Discovered or manually created in a SPECTRUM Topology View and then copied to an Organization and/or Location View.

To Start CoreWatch from within SPECTRUM:

1. Start SPECTRUM.

2. If you know the topology location for your SmartSwRtrGIGASwRtr model, proceed to that location. Otherwise, open the Find View by choosing the **View** menu, selecting **New View**, and then selecting **Find**. Select **Model-Type Name** and enter the **SmartSwRtrGIGASwRtr** command to display all the SmartSwRtrGIGASwRtr models or select **Network Address** to display a particular model.

3. Bring up the menu for the SmartSwRtrGIGASwRtr model and select CoreWatch. This starts CoreWatch using the SmartSwRtrGIGASwRtr model's network address and community name.

Starting CoreWatch from within HP OpenView 5.x

HP OpenView 5.x is network node management software for the Solaris and Windows NT environments. If HP OpenView is integrated with CoreWatch, you may use HP OpenView to start CoreWatch and recognize your SmartSwitchs. HP OpenView is automatically integrated with CoreWatch when you install CoreWatch while the HP OpenView daemon is running.

To start CoreWatch from within HP OpenView:

1. Start HP OpenView.

2. Click a network node.

3. Select the **Misc** menu and then choose CoreWatch. The **Login Dialog** dialog box appears.

4. Type the name or IP address and community string for the SmartSwitch. If you do not know this information, see your network administrator.

5. Click **OK**.

5

Troubleshooting

If you experience difficulty with the basic hardware or software setup procedures in this guide, check the following table to see whether the difficulty you are experiencing is described. If you find a description of the difficulty you are experiencing, try the resolution(s) recommended for the difficulty.

If the resolution does not remove the difficulty or the difficulty is not listed here, see the *Getting Help* section in Chapter 1 for technical support.

If you experience this difficulty	Try this remedy
An older software version continues to boot instead of the newer version on a TFTP server.	Use the procedure in "Loading System Image Software" on page 3-14 to configure the 6SSRM-02 to boot using newer software.
You are unable to access the configuration commands in the CLI.	From the CLI, type **enable** to access Enable mode, then type **configure** to access Configure mode.
Configuration changes do not seem to be taking effect.	Use the procedure in "Activating Configuration Changes and Saving the Configuration File" on page 3-17 to activate the changes.
Configuration changes are not reinstated after a reboot.	Use the procedure in "Saving the Active Configuration to the Startup Configuration File" on page 3-18 to save the configuration changes to the Startup configuration file.

If you experience this difficulty	Try this remedy
CoreWatch cannot access the 6SSRM-02.	Make sure you have properly installed CoreWatch and check the network connection between the CoreWatch management station and the 6SSRM-02.
The 6SSRM-02 is not resolving DNS names.	Use the procedure in "Setting the DNS Domain Name and Address" on page 3-10 to set up DNS.
	If you have already performed this procedure, make sure you can use NS lookup on the DNS server to get the default domain.
An SNMP manager cannot access the 6SSRM-02.	Use the procedure in "Setting Up SNMP Community Strings" on page 3-7 to set up an SNMP community string and specify a target for SNMP traps.
	If you have already performed this procedure, type **snmp show all** in the CLI to check the SNMP settings.
	Use the **traceroute** and **ping** commands to verify that the 6SSRM-02 can reach the SNMP management station.
You are unable to ping a certain host.	Create and add an IP or IPX interface for the host. See the *SmartSwitch Router User Reference Manual* for information.